

Mechanical and thermal behavior of plantain peel powder filled recycled polyethylene composites

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Abstract. In the arduous search for ways to clean up the environment and produce viable materials from waste plastics; plantain peel powder filled low density polyethylene wastes (wLDPE) were developed through melt mixing and compression moulding techniques. Optimum properties were determined at 15, 55 and 30 % formulation of plantain peel powder, and *Kankara* clay respectively. Composition with optimum properties has tensile strength of 55.5 MPa, flexural strength of 50.45 MPa and elastic modulus of 2.30 GPa with corresponding minimal water absorption of 0.95% after 30 days immersion period at room temperature. The thermal properties investigated by Dynamic Mechanical Analysis showed that the composite has better thermal stability at higher temperature than wLDPE. Similarly, through creep analysis, the composite was observed to have better load bearing capability at elevated temperature than waste low density polyethylene material. These results indicate that incorporation of treated plantain peel powder and *Kankara* clay into wLDPE enhanced the mechanical, thermal and creep resistance of wLDPE. This implies load bearing capability and potential suitability for different wall tiles applications.

Keywords: creep; dynamic mechanical analysis; low density polyethylene; plantain peel powder; waste low density polyethylene.

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